1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
22		$a = 3, b = -4, c = -2$ $x = \frac{--4 \pm \sqrt{(-4)^2 - 4 \times 3 \times -2}}{2 \times 3}$ $= \frac{4 \pm \sqrt{16 + 24}}{6} = \frac{4 \pm \sqrt{40}}{6}$ = 1.72075922 or = – 0.3874258867 OR $x^2 - \frac{4}{3}x - \frac{2}{3} = 0$ $\left(x - \frac{2}{3}\right)^2 - \left(\frac{2}{3}\right)^2 - \frac{2}{3} = 0$ $x - \frac{2}{3} = \sqrt{\left(\frac{2}{3}\right)^2 + \frac{2}{3}}$ $x = \frac{2}{3} \pm \sqrt{\frac{10}{9}}$	1.72, –0.387	3	M1 for $\frac{--4 \pm \sqrt{(-4)^2 - 4 \times 3 \times -2}}{2 \times 3}$ (condone incorrect signs for –4 and –2) M1 for $\frac{4 \pm \sqrt{40}}{6}$ or $\frac{2 \pm \sqrt{10}}{3}$ A1 for one answer in the range 1.72 to 1.721 and one answer in the range – 0.387 to – 0.38743 **OR** M1 for $\left(x - \frac{2}{3}\right)^2$ oe M1 for method leading to $\frac{2}{3} \pm \sqrt{\frac{10}{9}}$ oe A1 for one answer in the range 1.72 to 1.721 and one answer in the range – 0.387 to – 0.38743

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
19		16 metres: 8×10^8 km. 16: $8 \times 10^8 \times 1000$ 16: 8×10^{11} 1: 5×10^{10} **OR** 2 m to 10^8 km 2m to 100 000 000 000m 1m to 50 000 000 000m	1: 5×10^{10}	3	M1 (indep) correct method to convert to consistent units M1 $\frac{'8\times10^8'}{'16'}$ (units may not be consistent) **or** 5×10^{10} oe **or** 5×10^7 oe A1 1: 5×10^{10} **or** 1: 50 000 000 000 **OR** M1 (indep) correct method to convert to consistent units M1 $\frac{'16'}{8}$ to '10^8' A1 1: 5×10^{10} **or** 1: 50 000 000 000
20		$\frac{3(x+1)}{6}+\frac{2(x+3)}{6}=\frac{3x+3+2x+6}{6}$	$\frac{5x+9}{6}$	3	M1 Use of common denominator of 6 (**or** any other multiple of 6) and at least one numerator correct Eg. $\frac{3(x+1)}{6}$ or $\frac{2(x+3)}{6}$ M1 $\frac{3(x+1)}{6}+\frac{2(x+3)}{6}$ oe A1 cao

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	3.75	P1	works to find vol of frustum eg $1/3\pi(3.6)^2\times6.4 - 1/3\pi(1.8)^2\times3.2$ or 86.858.. – 10.857… (=24.192π or 76.00..)	
		P1	works to find vol of hemisphere eg $\frac{1}{2}\times\frac{4}{3}\pi\times3.6^3$ (=31.104π or 97.7....)	781.7… by use of diameter does not get the mark
		P1	mass of frustum as [vol]×density eg "76.00" × 2.4 (=182.4..) **or** mass of hemisphere as [vol]×density eg "97.7...."×4.8 (=469.037...)	[vol] is their volume which could be ft using the radius, using the diameter, or could be another value as long as it is stated as being the volume, or clearly intended from working.
		P1	mean density as total mass ÷ total volume eg ("182.4.." + "469.037") ÷ ("76…" + "97.7..") or "651.4..". ÷ "173.7...."	All figures must come from correct method shown.
		A1	answer in the range 3.7 to 3.8	
21	proof	C1	uses cyclic quad eg if $CAB = x$ then $CRO = 180 - x$ (Opposite angles of a cyclic quadrilateral add up to 180°.)	Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked do not credit.
		C1	establishes relationship outside a circle eg $ORB = x$ (Angles on a straight line add up to 180)	Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		C1	uses properties of a circle eg $RO = OB$ (both radii) so $ABC = x$ (Base angles of an isosceles triangle are equal.)	
		C1	Complete proof and conclusion	Full reasons given without any redundant reasons and correct reasoning throughout.

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1	16.2	M1	for a correct first step to find BC, eg $19^2 = 10^2 + BC^2$ or $19^2 - 10^2$ $(= 261)$ or $\sqrt{19^2 - 10^2}$ or $\sqrt{261}$ or $3\sqrt{29}$	Can use alternative letter for BC provided intention is clear If using an alternative method using trigonometry must have BC as the only unknown
		A1	for answer in the range 16.1 to 16.2	ISW incorrect rounding if answer given in range
2 (a)	$2\times3\times3\times5$	M1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one error **or** by division by prime factors with no more than one error **or** for 2, 3, 3, 5	Condone the inclusion of 1 for this mark
		A1	for $2\times3\times3\times5$ oe	Accept $2\times3^2\times5$
(b)	36	B1	for 36	Accept $2^2\times3^2$ or $2\times2\times3\times3$
3	4	M1	for method to use formula, eg $72\div6$ $(=12)$ or $72\div9$ $(=8)$	Can be implied by $\frac{72}{6}$ or $\frac{72}{9}$
		A1	cao	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
17 (a)	Shows re-arrangement	C1	for showing rearrangement, must see $x^4 = x^2 + 5$ leading to $x = \sqrt[4]{x^2 + 5}$	Can work backwards
(b)	1.669763088	M1	for substitution to find x_1 eg $\sqrt[4]{1.5^2 + 5}$ (= 1.64...)	
		M1	for substitution to find x_2 eg $\sqrt[4]{"1.64\ldots"^2 + 5}$ (= 1.66...)	
		A1	for answer in the range 1.6697 to 1.6698 or 1.67(0)	If a correct value is given and then rounded or rounded incorrectly award full marks
18	Shown	M1	for start to method to find a ratio connecting 2 of a, b and c, eg $a : c = 3 : 5$ oe or $b : c = 5 : 3$ oe **or** for start to method to combine ratios, eg $14a : 35c$ (= 126 : 525) **and** $20b : 35c$ (= 500 : 525)	May be expressed in fractional form Any ratios must be clearly assigned to variables
		M1	for method to find $a : b : c$, eg 9 : 25 :15 oe **or** for method to write $a + b : b + c$ in terms of one variable eg $\frac{3c}{5} + \frac{5c}{3} : \frac{5c}{3} + c$	
		A1	for $a + b : b + c = 34 : 40$ oe leading to result	34: 40 may be seen as $9 + 25 : 25 + 15$
19	46.989...	B1	for stating at least one bound, 9.25 or 9.35 or 12.55 or 12.65	Accept $9.34\dot{9}$ or 9.3499(…) or $12.64\dot{9}$ or 12.6499(…)
		P1	for correct use of LB and UB, eg $\sin x = \frac{[\text{LB of } AB]}{[\text{UB of } AC]}$	$9.25 \leq \text{LB} < 9.3$ $12.6 < \text{UB} \leq 12.65$ $\sin(x) = 0.731(\ldots)$
		A1	for answer in the range 46.98 to 47 from correct working	Answer only award no marks.

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
13	58.5	P1	for start of process to find angle BCA, eg $\frac{18}{\sin 70} = \frac{15}{\sin BCA}$ or $\frac{\sin 70}{18} = \frac{\sin BCA}{15}$	Angle BCA must be correctly identified to gain marks $\sin 70 = 0.939\ldots$ $\sin 70 \div 18 = 0.052\ldots$ $18 \div \sin 70 = 19.1\ldots$
		P1	for rearrangement, eg $(\sin BCA =)\frac{15\sin 70}{18}$ $(= 0.783\ldots)$ oe **or** $BCA = 51.5\ldots$	
		P1	for complete process to find angle BAC, eg $180 - 70 - \sin^{-1}\left(\frac{15\sin 70}{18}\right)$	
		A1	for answer in the range 58.4 to 58.5	If an answer is given in the range in working and then rounded incorrectly award full marks.
14	$\frac{x + 2}{2x + 1}$	M1	for correctly factorising one expression, eg $(x - 3)(x + 2)$ or $(x - 3)(2x + 1)$	
		M1	for factorising both expressions, eg $(x - 3)(x + 2)$ and $(x - 3)(2x + 1)$	
		A1	oe or $a = 1, b = 2, c = 2, d = 1$	eg $\frac{2 + x}{1 + 2x}$, $\frac{-x - 2}{-2x - 1}$

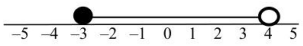
PAPER: 1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
12	(a)		$5n - 1$	2	B2 for $5n - 1$ oe (B1 for $5n + c$ ($c \neq -1$ or absent) or $n = 5n - 1$)
	(b)		$2(3n - n^2)$	1	B1 for $2(3n - n^2)$ oe
13	(a)		$-4, -3, -2, -1, 0$	2	B2 for all 5 correct values; ignore repeats, any order (B1 for 4 correct (and no incorrect) values or all 5 correct values and -5)
	(b)		$x > 4½$	2	M1 for an attempt to expand brackets (eg $6\times x - 6\times 2$) or $6x - 12$ or for an intention to divide both sides by 6 as the first step or for $4½$ oe seen A1 for $x > 4½$ oe
14		12, 24, 36, 48, 60, 72, …. 8, 16, 24, 32, 40, 48, 56, 64, 72,…	25.80	5	M1 for listing at least 3 multiples of each of 12 and 8 or 24 in two lists of multiples or from factor trees M1 (dep) for attempt to find a common multiple of 12 and 8 above 60 (=72) M1 (dep M2) for method to find the number of boxes **and** the number of packs $72 \div 12$ (=6) and $72 \div 8$ (=9) M1 for finding the total cost by multiplying numbers by cost and adding eg "6" × 2.50 + "9" × 1.20 A1 for 25.8(0)

PAPER: 1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
15		$3x + y = 30$ $x + 3y = 22$	8.50 4.50	4	M1 for forming two algebraic equations M1 for a correct process to eliminate one variable (condone one arithmetic error) M1 (dep) for substituting found value in one of the equations or appropriate method after starting again (condone one arithmetic error) A1 for 8.5(0) and 4.5(0)
16		$AC^2 = 5^2 + 3^2$ $AC = \sqrt{25+9}$ (=5.83) $\frac{5}{5.83} = \frac{DB}{3}$ $DB = \frac{5}{5.83} \times 3$ (= 2.57) 5 + 3 + 5.83 + 2.57 = **OR** $AC = \sqrt{25+9}$ (=5.83) $\tan A = \frac{3}{5}$ $A = 30.96$ $\sin 30.96 = \frac{DB}{5}$ $DB = 5 \times \sin 30.96$ (= 2.57) 5 + 3 + 5.83 + 2.57 =	16.4	5	M1 for $(AC^2) = 5^2 + 3^2$ =34) M1 for $\sqrt{25+9}$ or $\sqrt{34}$ (=5.83) M1 for $\frac{5}{'5.83'} = \frac{DB}{3}$ or $DB \times AC = 5 \times 3$ M1 for (DB =) $\frac{5}{'5.83'} \times 3$ A1 for 16.4 to 16.41 **OR** M1 for $(AC^2) = 5^2 + 3^2$ (=34) M1 for $\sqrt{25+9}$ or $\sqrt{34}$ (=5.83) M1 for using a correct trig ratio in an attempt to find angle A or angle C, e.g. $\tan A = \frac{3}{5}$, $\sin A = \frac{3}{'5.83'}$, $\cos C = \frac{3}{'5.83'}$ M1 for using DB in a a correct trig ratio, e.g. sin'30.96' = $\frac{DB}{5}$ A1 for 16.4 to 16.41

PAPER: 1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		360	2	M1 30 ÷ 10 (= 3) or 120 ÷ 10 (=12) or 120 + 120 + 120 oe A1 cao
	(b)		25	2	M1 for $\frac{750}{300}$ (=2.5) oe A1 cao
2	(a)		Relationship	1	B1 for description of relationship eg "As the length of the pine cone increases the width increases" oe (accept positive correlation)
	(b)		6.1 to 6.4	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or a vertical line from 8.4 or a point at (8.4, y) where y is from 6.1 to 6.4 A1 for given answer in the range 6.1 to 6.4
3	(a)		–1	2	M1 for $3 \times -5 + 7 \times 2$ A1 cao
	(b)		$3(x + 2)$	1	B1 cao
	(c)		$7y - 16$	2	M1 for intention to expand a bracket eg $5y - 10$ or $2y - 6$ A1 cao
	(d)		m^8	1	B1 cao
	(e)		p^4	1	B1 cao

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
14		Region R shaded	M1 M1 A1	for two of the lines $y = 1$, $x + y = 5$, $y = 2x$ correctly drawn for three lines correctly drawn for fully correct region indicated with all lines correct
15 (a)		No with reason	C1	for "no" with reason, eg Tracey should multiply 8 and 7
(b)		66	M1 A1	for starting a method to find number of games played, eg 12×11 (= 132) or sum of integers from 1 to 11 cao
16	$\frac{--4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 1}}{2 \times 1}$	0.268, 3.73	M1 A1	for $x - 2 = \pm\sqrt{3}$ oe or one solution or use of $x^2 - 4x + 1 = 0$ to substitute into formula (allow one error in substitution) 0.267 – 0.27, 3.7 – 3.74

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
3 (a)		31.4	P1	for working with circumference formula, eg $\pi \times 80$ (=251. …) oe
			A1	for answer in the range 31.4 to 31.5 accept 10π
(b)		No (supported)	C1	Mean distance stays the same with reason, eg total distance remains unchanged or same number of points
4		$\frac{1}{11}$	P1	for starting the process, eg by writing down a correct ratio or using a given number of cubes for one relationship, eg 2B 1Y or B:Y = 2:1 or 4G 1B or G:B = 4:1 or 8G, 1Y or G:Y = 8:1 oe or yellow = 2, blue = 4, or states 2:1:8 oe in any order (can be algebraic)
			P1	for complete process to find possible number of each colour or equivalent ratio, eg 8G 2B 1Y or G:B:Y = 8:2:1 oe or yellow = 2, blue = 4, green = 16 oe (can be algebraic)
			A1	$\frac{1}{11}$ oe
5 (a)		(−2, 1) (−4, 1) (−2, 2) (−5, 2)	B1	Shape labelled **A**
(b)		(1, −4) (3, −4) (1, −5) (4, −5)	B1	Shape labelled **B**

Paper: 1MA1/2H					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1	(a)	$x > -1$	B1	cao	
	(b)	Diagram drawn	C2	for a fully correct diagram, eg  	
			(C1	for drawing a line from −3 to 4 **or** (indep) for an open circle at 4 **or** (indep) for a closed circle at −3)	Condone arrow heads or line ending to denote the 'end' of the line
2	(a)	12	M1	for a correct factor tree for either 60 **or** 84 with no more than one arithmetic error **or** for listing factors of 60 **or** 84, at least 4 correct for either (with no more than 1 incorrect in either list), could be in factor pairs **or** for the prime factors of 60 (2, 2, 3, 5) **or** 84 (2, 2, 3, 7)	Condone the use of 1 in any factor tree 60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 84: 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
			A1	for 12 or 2×2×3 oe SC B1 for answer of 4 or 6, if M0 scored	2,2,3 is not enough, it must be a product
	(b)	120	M1	for a correct factor tree for either 24 **or** 40 with no more than one arithmetic error **or** for at least 3 multiples of both 24 and 40 (can include 24 and 40) **or** for the prime factors of either 24 (2, 2, 2, 3) **or** 40 (2, 2, 2, 5) **or** for a common multiple from their lists (≠ 120)	Condone the use of 1 in any factor tree 24: 24, 48, 72, 96, 120, … 40: 40, 80, 120, … For the list not containing 120, accept the first 3 correct multiples or one error in the first 4 multiples
			A1	for 120 or 2×2×2×3×5 oe	

Question **18(c)**

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
18	$\left(\frac{-16}{5}, \frac{48}{5}\right)$	P1	for a method to find gradient of $\mathbf{L}_1$ eg $\frac{6-2}{4-12}$ $(= -\frac{1}{2})$ or states $\mathbf{L}_2$ as $y = -3x$	Ignore sketches.
		P1	(dep on P1) for a method to find equation of $\mathbf{L}_1$ eg subs into $y =$ "$-\frac{1}{2}$"$x+c$ OR states $\mathbf{L}_1$ as $y =$ "$-\frac{1}{2}$"$x + 8$	
		P1	(dep on P2) complete method to equate both lines eg "$-\frac{1}{2}$"$x + 8 = -3x$	
		A1	oe	Accept equivalents eg $(-3.2, 9.6)$
19	$9 < m < 11$ $-11 < m < -9$	M1	for a correct method to begin rearranging to solve for m^2 eg $88 < m^2 + 7$ or $m^2 + 7 < 128$ or $81 < m^2 < 121$	It is insufficient to just multiply all three elements by 4; some rearrangement must occur such as showing as two separate inequalities or isolating m^2
		M1	for a complete method to $m^2 = 81$ or $m^2 = 121$ or better	Accept an inequality used in place of "=". m^2 must be isolated at this stage.
		M1	for a set of critical values: at least two out of 9, 11, −9, −11	Do not award if other values are also given eg 10
		M1	for selecting a correct inequality for one set of critical values eg $9 < m$ and $m < -9$ **or** $m < 11$ and $-11 < m$ **or** $9 < m$ and $m < 11$ or a set of inequalities with some error eg $9 \; ? \; m \; ? \; 11$ and $-11 \; ? \; m \; ? \; -9$ where ? is an incorrect inequality symbol like $9 < m \leq 11$ or $9 \geq m \geq 11$ or answer given as $\pm 9 < m < \pm 11$	Could be shown as $9 < m < 11$ or $-11 < m < -9$ or $-11 < m < 11$
		A1	$9 < m < 11$ and $-11 < m < -9$ given as boundaries of m	Accept with an "and" or an "or" or neither

Paper: 1MA1/2H					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
3	(i)	65	M1 A1	for working with proportion eg 10 ÷ 30 × 195 (=65) cao	Condone use of 200 for 195
	(ii)	statement	C1	for statement **Acceptable examples** sample is representative (otherwise answer wrong) random sample (otherwise answer will be different) the 30 students are from the 195 (otherwise not accurate) 10 out of every 30 want to go to the Theme Park (otherwise answer will be different/wrong) there is no bias **Not acceptable examples** There would be more than 10 people who want to go to the Theme Park I rounded my answer	
4		8	P1 P1 P1 A1	for working with volume of the cuboid, eg 30 × 6 × 19 (= 3420) **OR** for using $\frac{2}{3}$ with one dimension, eg. 30 × 2 ÷ 3 (= 20) for "3420" × 2 ÷ 3 (= 2280) **or** "3420" ÷ 3 (= 1140) **OR** "20" × 6 × 19 (= 2280) **OR** "3420" ÷ 275 (= 12.4… = 12 cups) (dep on P2) for "2280" ÷ 275 (= 8(.29...)) **or** "1140" ÷ 275 (= 4(.14...)) **OR** "12" × 2 ÷ 3 **OR** for 275 × 8 (= 2200) **or** 275 × 9 (= 2475) cao	For P marks, ignore attempts at unit conversion

Paper: 1MA1/2H					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
3	(i)	65	M1 A1	for working with proportion eg 10 ÷ 30 × 195 (=65) cao	Condone use of 200 for 195
	(ii)	statement	C1	for statement **Acceptable examples** sample is representative (otherwise answer wrong) random sample (otherwise answer will be different) the 30 students are from the 195 (otherwise not accurate) 10 out of every 30 want to go to the Theme Park (otherwise answer will be different/wrong) there is no bias **Not acceptable examples** There would be more than 10 people who want to go to the Theme Park I rounded my answer	
4		8	P1 P1 P1 A1	for working with volume of the cuboid, eg 30 × 6 × 19 (= 3420) **OR** for using $\frac{2}{3}$ with one dimension, eg. 30 × 2 ÷ 3 (= 20) for "3420" × 2 ÷ 3 (= 2280) **or** "3420" ÷ 3 (= 1140) **OR** "20" × 6 × 19 (= 2280) **OR** "3420" ÷ 275 (= 12.4… = 12 cups) (dep on P2) for "2280" ÷ 275 (= 8(.29...)) **or** "1140" ÷ 275 (= 4(.14...)) **OR** "12" × 2 ÷ 3 **OR** for 275 × 8 (= 2200) **or** 275 × 9 (= 2475) cao	For P marks, ignore attempts at unit conversion

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
22 (a)	163 or 164	P1	uses formula eg $1.2 \times 200 - 50$ (= 190)	
		P1	for complete process, eg May: $1.2 \times$ "190" $- 50$ (= 178) **and** June: $1.2 \times$ "178" $- 50$ (= 163.6)	
		A1	for 163 or 164	
(b)	Statement	C1	(dep P1) ft statement, eg there won't be any rabbits, fewer rabbits, decrease	
23 (a)	Shown	C1	for a method to find the area of half of the parallelogram or of the whole parallelogram, eg $\frac{1}{2}(2x - 1)(10 - x)\sin 150$ or $\frac{1}{2}(2x - 1)(10 - x) \times \frac{1}{2}$ oe or $(2x - 1)(10 - x)\sin 150$ or $(2x - 1)(10 - x) \times \frac{1}{2}$ oe	
		C1	for a correct expansion of the whole area eg $\frac{1}{2}(20x - 10 - 2x^2 + x)$ or $\frac{1}{2}(-2x^2 + 21x - 10)$ or $-x^2 + 10.5x - 5$	
		C1	complete chain of reasoning with fully correct algebra dealing with the inequality eg $x^2 - 10.5x + 5 < -15$ or $x^2 - 10.5x + 20 < 0$ or $2x^2 - 21x + 10 < -30$ which lead to $2x^2 - 21x + 40 < 0$	
(b)	$2.5 < x < 8$	M1	for factorising, $(2x - 5)(x - 8)$	Could use the formula
		A1	for critical values, 2.5, 8	
		A1	for any statement that x is greater than 2.5 and x is less than 8	Need not be given as an inequality statement

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16	$\frac{52}{72}$	P1 P1 A1	for $\frac{4}{9}\times\frac{3}{8}\left(\frac{12}{72}\right)$ **or** $\frac{4}{9}\times\frac{5}{8}$ **or** $\frac{5}{9}\times\frac{4}{8}\left(\frac{20}{72}\right)$ for $1-\left(\frac{5}{9}\times\frac{4}{8}\right)$ **or** $\frac{4}{9}\times\frac{3}{8}+\frac{4}{9}\times\frac{5}{8}+\frac{5}{9}\times\frac{4}{8}$ oe for $\frac{52}{72}$, $\frac{13}{18}$ oe SC B1 for answer of $\frac{56}{81}$ (replacement)	Accept equivalent fractions, decimals (0.72…) or percentages (72.22…..%)
17	61	B1 M1 A1	angle $OAD = 90$, may be marked on diagram method to work out angle OAB (=29) cao	Angle could be shown by a right-angle symbol Correct method can be implied from angles on the diagram if no ambiguity or contradiction. Reasons need not be given. Award 0 marks for an answer of 61 with no other working.
18	Bar of height 3.2	M1 M1 C1	method to find any frequency eg 1.2 × 2.5 (= 3) or 2 × 2.5 (= 5) or 2.8 × 5 (= 14) or 0.8 × 12.5 (= 10) **or** method to use areas eg 12 × 5 (=60) or 20 × 5 (=100) or 28 × 10 (=280) or 8 × 25 (=200) complete method to find total frequency for the four intervals eg "3" + "5" + "14" + "10" (=32) **or** "60" + "100" + "280" + "200" (=640) cao	Accept equivalent methods proportional to those shown

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1	Two statements	C2 (C1	Two different statements **Acceptable** There is no 'frequency' label / *y*-axis is not labelled / no title for the *y*-axis The polygon should not be closed / have a line at the bottom / have first and last points connected (15, 6) has been plotted incorrectly / at (15, 8) / (The first point is at) 8 rather than 6 / First point is on an incorrect frequency **Not acceptable** There is no title / Points should be joined with a curve / *x*-axis doesn't start at 0 There is no label / The axes have not been labelled (*x* and *y*) The points haven't (all) been plotted correctly $10 < w \leq 20$ and $30 < w \leq 40$ have been plotted wrong The first point is plotted incorrectly, its at (15, 7) not (15, 6) The points have been joined up wrong / Points should not be joined in the shape of a triangle / They've connected all the points Done the midpoints rather than the numbers on the right side / The points are in the middle for one statement eg from those above)	Ignore additional statements provided no contradiction
2	127.5 and 128.5	B1 B1	for 127.5 in the correct position for 128.5 in the correct position	 Accept $128.4\dot{9}$ or 128.499...
3	18	P1 P1 P1 A1	for 240 ÷ 10 (= 24) **or** 240 ÷ 8 (= 30) for 3 × "24" (= 72) **or** 7 × "24" (= 168) **or** 3 × "30" (= 90) **or** 5 × "30" (= 150) for 3 × "24" (= 72) **and** 3 × "30" (= 90) **or** 7 × "24" (= 168) **and** 5 × "30" (= 150) Cao	Accept 3 + 7 for 10, 3 + 5 for 8

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15	(M) 18, (K) 15	P1	for start of process, eg $(6x + 1.5)$ **and** $(5x + 1.5)$ **or** $(6x + 1.5)$ **and** $(11x + 3)$ **or** $a + 1.5$ **and** $b + 1.5$ **OR** starts to work with ratio, eg 6 : 5 = 12 : 10	
		P1	for setting up an equation, eg $\frac{6x+1.5}{5x+1.5}=\frac{13}{11}$ **or** $66x + 16.5 = 65x + 19.5$ **or** $\frac{6x+1.5}{11x+3}=\frac{13}{24}$ **or** $144x + 36 = 143x + 39$ **or** $\frac{a}{b}=\frac{6}{5}$ **and** $\frac{a+1.5}{b+1.5}=\frac{13}{11}$ **or** $5a = 6b$ **and** $11a + 16.5 = 13b + 19.5$ oe **OR** for comparing 12 : 10 to 13 : 11 **and** deducing 1 part = 1.5	
		P1	for isolating in terms of x, eg $66x - 65x = 19.5 - 16.5$ **or** $144x - 143x = 39 - 36$ **or** $x = 3$ **or** for eliminating a or b, eg $55a = 66b$ **and** so $66b = 65b + 15$ **OR** for process to find values for M **and** K, eg 12×1.5 **and** 10×1.5	
		A1	cao	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
12	$6x^3 + x^2 - 20x - 12$	M1 M1 A1	for method to find the product of any two linear expressions (3 out of no more than 4 terms correct with correct signs or 4 correct terms ignoring signs), eg. $6x^2 + 9x + 4x + 6$ or $3x^2 + 2x - 6x - 4$ or $2x^2 + 3x - 4x - 6$ for method of multiplying out remaining products, half of which are correct (ft their first product), eg. $6x^3 + 13x^2 - 12x^2 + 6x - 26x - 12$ cao	Note that, for example, $6x^2 + 13x$ or $13x + 6$ are regarded as three terms in the expansion of $(x - 2)(3x + 2)$ First product must be quadratic but need not be simplified or may be simplified incorrectly.
13	192 000	M1 A1	for $16 \times 120 \times 100$ oe cao	
14	25 with reasons	M1 M1 C2 (C1	for method to find angle *BCD* eg $180 \div (3 + 1)$ (= 45) **or** *BAD* = $180 \div (3 + 1) \times 3$ (=135) for method to find angle *BDA* eg $180 - 20 - (180 - "45")$ (=25) **or** method to find angle *SBD* eg *SBD* = *BCD* (=45) for finding *SBA* (=25) and both reasons given, eg Opposite angles of a cyclic quadrilateral add up to 180 for angle *SBD* = 45 because alternate segment theorem (dep M1) for one reason given Opposite angles of a cyclic quadrilateral add up to 180 for angle *SBD* = 45 because alternate segment theorem)	Could be shown on the diagram or in working Do not award if it ambiguous as to which angle is being found Underlined words need to be shown; reasons need to be linked to their method

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
10	344 580.48	P1	for a start to the process to find the initial investment eg 344 605 ÷ 1.025 oe (= 336 200) **or** for 1.025^3 (= 1.07689….)	
		P1	for complete process to find original investment, eg 344 605 ÷ 1.025^3 oe (= 319 078 to 320 265)	
		P1	for [initial investment] × 1.02^2 × 1.035 oe	[initial investment] must be clearly what they believe to be that and cannot be 344605
		A1	for answer in the range 343 587 to 344 581	
11 (a)	(9, 7.5)	M1	for x coordinate = $PO\ (6) \times \frac{3}{2}$ (=9) **or** y coordinate = $OQ\ (3) \times \frac{5}{2}$ (= 7.5) **or** $PO\ (6) \times \frac{5}{2}$ (=15) **or** $OQ\ (3) \times \frac{3}{2}$ (= 4.5)	
		A1	cao	
(b)	$y = -2x + 3$	P1	for process to find the gradient of the line, eg 3 ÷ 6 (=0.5) **or** $y = mx + 3$	Could use P and R or Q and R as ft from (a)
		P1	for process to find gradient of perpendicular eg $-1 \div$ [gradient of PQ] ($= -2$)	
		A1	for $y = -2x + 3$ oe	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
5	41.6	P1	for start of process to find the length of the hypotenuse, eg (hyp^2 =) $8^2 + 10^2$ (= 164)	Note lengths may be seen on the diagram
		P1	for complete process to find hypotenuse, eg $\sqrt{8^2+10^2}$ **or** $\sqrt{64+100}$ **or** $\sqrt{164}$ (= 12.8…)	
		P1	(dep P2) for complete process to find the required perimeter, eg $8 + 8 + 10$ + "12.8" + "12.8 – 10" **or** $16 + 4\sqrt{41}$	8 + 8+ "12.8" + "12.8" oe is acceptable for this mark
		A1	for answer in the range 41 to 42	If an answer in the range 41 to 42 is given in the working space then incorrectly rounded, award full marks.
6 (a)	17.8	M1	for tan 56 = $\frac{x}{12}$ or (BC) =12 × tan 56 oe **or** alternative method to find BC	For any alternative method candidates must arrive at an equation with BC as the only unknown
		A1	for an answer in the range 17.7 to 17.8	If an answer in the range 17.7 to 17.8 is given in the working space then incorrectly rounded, award full marks.
(b)	33.6	M1	for cos x = $\frac{15}{18}$ **or** cos x =0.83.. **or** x = cos^{-1} $\frac{15}{18}$ **or** alternative method to find x	For any alternative method candidates must arrive at an equation with x as the only unknown
		A1	for an answer in the range 33.5 to 33.91	If an answer in the range 33.5 to 33.91 is given in the working space then incorrectly rounded, award full marks.